

### REMARKS

Applicant respectfully requests further examination and reconsideration in view of the above amendments and the comments set forth fully below. Claims 1-69 were pending in the application.

Within the Office Action, Claim 17 has been rejected under §112 as being indefinite. Claims 1-69 have been rejected under 35 U.S.C. §102(b) as being anticipated by United States Patent No. 5,314,071 to Christian, et al. (hereinafter referred to as "Christian"). Claims 29-38, 40-42, 44-53, 55-66, and 68-69 have been rejected under §102(b) as being anticipated by United States Patent No. 5,894,938 to Ichise, et al. (hereinafter referred to as "Ichise"). Claims 29-35, 42, 44-45, 48, 51, 56-58, 61 and 64 were rejected under §102(b) as being anticipated by United States Patent No. 5,314,072 to Frankel, et al. (hereinafter referred to as "Frankel").

By the above amendment, Claims 1, 17, 29 and 44-50 have been amended. Accordingly, Claims 1-69 are now pending.

#### **I. Rejection of Claim 17 under §112**

Within the Office Action, Claim 17 has been rejected under §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant has amended Claim 17 to recite that the system receives at least one of the plurality of subsequent output feeds and sorts the received feed into a plurality of final output feeds. In view of the foregoing, Applicant respectfully requests reconsideration and withdrawal of the rejection of Claim 17 under §112.

#### **II. Rejections Under §102 as being Anticipated by Christian**

Within the Office Action, Claims 1-69 have been rejected under §102(b) as being anticipated by Christian. The Applicant respectfully disagrees.

Christian does not disclose, teach, or even suggest the claimed invention. Specifically, Figures 2 and 12, and column 7, lines 55+, of Christian were cited within the Office Action. However, Christian's Figure 2 does not disclose, teach, or even suggest a system that has at least one sorting device that sorts different colored objects into *more than two output feeds*. Moreover, Christian's Figure 12 does not disclose, teach, or even suggest that at least one output feed in the plurality of output feeds is a subsequent input feed to one or more sorting devices in the plurality of sorting devices.

In reference to Figure 12, Christian, at column 8, lines 6-8, states that conveyors may be placed at the bottom of the bins in order to convey the crushed glass to desired locations. Hence,

the description of Figure 12 actually teaches away from having at least one output feed in the plurality of output feeds be a subsequent input feed to one or more sorting devices in a plurality of sorting devices. Accordingly, Christian does not disclose, teach, or even suggest a system that has:

- At least one sorting device that sorts the different colored objects into more than two output feeds; and
- At least one output feed that is a subsequent input feed to one or more sorting devices in the plurality of sorting devices.

Claim 1 is directed to a system for sorting a mixed stream of different colored objects into separate groups of same colored objects. The system of Claim 1 comprises a plurality of sorting devices each for receiving an input feed of different colored objects and sorting the different colored objects into a plurality of output feeds, wherein at least one output feed in the plurality of output feeds is a subsequent input feed to one or more sorting devices in the plurality of sorting devices and further wherein at least one of the plurality of sorting devices sorts the different colored objects into more than two output feeds. As discussed above, Christian does not teach a plurality of sorting devices wherein at least one output feed is a subsequent input feed and wherein at least one of the plurality of sorting devices sorts the different colored objects into more than two output feeds. For at least these reasons, the independent Claim 1 is allowable over the teachings of Christian.

Claims 2-14 are dependent on the independent Claim 1. As discussed above, the independent Claim 1 is allowable over the teachings of Christian. Accordingly, Claims 2-14 are all also allowable as being dependent on an allowable base claim.

The independent Claim 15 is directed to a method of effectively sorting a group of different colored objects into separate groups of similar colored objects. The method of Claim 15 comprises receiving an input feed having a plurality of objects and sorting the input feed into more than two output feeds, wherein at least one output feed in the output feeds serves as a subsequent input feed. As described above, Christian does not disclose, teach, or even suggest sorting the input feed into more than two output feeds, and wherein at least one output feed in the output feeds serves as a subsequent input feed. For at least these reasons, the independent Claim 15 is allowable over the teachings of Christian.

Claims 16-28 are dependent on the independent Claim 15. As discussed above, the independent Claim 15 is allowable over the teachings of Christian. Accordingly, Claims 16-28 are all also allowable as being dependent on an allowable base claim.

The independent Claim 29 is directed to a method of effectively sorting different colored objects into a plurality of groups of objects having a similar desired quality. The method of Claim 29 comprises providing a plurality of sorting devices, wherein each sorting device receives a mixture of objects of different qualities and separates the different received objects into two or more output feeds, each output feed having objects of a substantially similar quality, wherein at least one of the plurality of sorting devices sorts the different colored objects into more than two output feeds and configuring the plurality of sorting devices such that at least one output feed in each of one or more sorting devices in the plurality is input into a corresponding subsequent sorting device. As described above, Christian does not disclose, teach, or even suggest sorting the received objects into more than two output feeds, and wherein at least one output feed in each of the sorting devices is input into a corresponding subsequent sorting device. Christian's Figure 12 illustrates the cullets being blown into three bins, but does not disclose, teach, or even suggest that at least one output feed of one or more sorting devices is input into a corresponding subsequent sorting device. In fact, Christian's description teaches away from such a limitation. Moreover, Christian's Figure 2 does not disclose, teach, or even suggest sorting the received objects into more than two output feeds. For at least these reasons, the independent Claim 29 is allowable over the teachings of Christian.

Claims 30-42 are dependent on the independent Claim 29. As discussed above, the independent Claim 29 is allowable over the teachings of Christian. Accordingly, Claims 30-42 are all also allowable as being dependent on an allowable base claim.

The independent Claim 43 is directed to a multi-level sorting system for separating different colored cullets into cullets having substantially similar color characteristics. The system of Claim 43 comprises a first means for sorting the cullets, wherein the first means for sorting directs the sorted cullets into more than two first output paths, a second means for further sorting at least one received first output path, wherein the second means for sorting directs the further sorted cullets into more than two second output paths, and a third means for subsequently sorting at least one received first output path and at least one received second output path, wherein the third means for sorting directs the subsequently sorted cullets into more than two output paths. As described above, Christian does not teach a multi-level sorting system comprising first, second and third means for sorting cullets into more than two output paths, and that the second sorting means sorts a first output path, or that the third sorting means sorts a first and a second output path. For at least these reasons, the independent Claim 43 is allowable over the teachings of Christian.

The independent Claim 44 recites a multi-level sorting system for separating a mixed stream of colored cullets into cullets having substantially similar color characteristics. The multi-level sorting system of claim 44 comprises a first stage tri-sorter for sorting the cullets, wherein the first stage tri-sorter directs the sorted cullets into a plurality of first stage output paths, a second stage tri-sorter coupled to the first stage tri-sorter, the second stage tri-sorter for sorting cullets in at least one received first stage output path, thereby forming a second set of sorted cullets, wherein the second stage tri-sorter directs the second set of sorted cullets into a plurality of second stage output paths, a third stage tri-sorter coupled to the first and second stage tri-sorters, the third stage tri-sorter for sorting cullets in at least one received first stage output path and at least one received second stage output path, thereby forming a third set of sorted cullets, wherein the third stage tri-sorter directs the third set of sorted cullets into a plurality of third stage output paths, wherein at least one of the first, second, and third stage tri-sorters has more than two output paths. As described above, Christian does not disclose, teach, or even suggest such a multi level sorting system. For instance, Christian does not teach a first stage tri-sorter, a second stage tri-sorter and a third stage tri-sorter, where at least one of the first, second and third stage tri-sorters has more than two output paths. Further, Christian does not teach a third stage tri-sorter that sorts cullets received in output paths from both first and second stage tri-sorters. For at least these reasons, the independent Claim 44 is allowable over the teachings of Christian.

Claims 45-56 are dependent on the independent Claim 44. As discussed above, the independent Claim 44 is allowable over the teachings of Christian. Accordingly, Claims 45-56 are all also allowable as being dependent on an allowable base claim.

The independent Claim 57 is directed to a multi-level sorting system for separating a mixed stream of colored cullets into cullets having substantially similar color characteristics. The multi-level sorting system of Claim 57 comprises a plurality of first stage tri-sorters for sorting the cullets, wherein the plurality of first stage tri-sorters direct the sorted cullets into a plurality of first output paths, a second stage tri-sorter coupled to the plurality of first stage tri-sorters, the second stage tri-sorter for sorting cullets in at least one received first output path from each first stage tri-sorter, thereby forming second sorted cullets, wherein the second stage tri-sorter directs the second sorted cullets into a plurality of second output paths, and a third stage tri-sorter coupled to the plurality of first stage tri-sorters and the second stage tri-sorter, the third stage tri-sorter for sorting cullets in at least one received first output path from each of the plurality of first stage tri-sorters and at least one received second output path, thereby forming third sorted cullets, wherein the third stage tri-sorter directs the third sorted cullets into a plurality

of third output paths. As described above, Christian does not teach a plurality of first stage tri-sorters, a second stage tri-sorter and a third stage tri-sorter. Further, Christian does not teach a second stage tri-sorter that receives cullets from output paths from a plurality of first stage tri-sorters. Still further, Christian does not teach a third stage tri-sorter which sorts cullets received in output paths from both first and second stage tri-sorters. For at least these reasons, the independent Claim 57 is allowable over the teachings of Christian.

Claims 58-69 are dependent on the independent Claim 57. As discussed above, the independent Claim 57 is allowable over the teachings of Christian. Accordingly, Claims 58-69 are all also allowable as being dependent on an allowable base claim.

### **III. Rejections Under §102 as being Anticipated by Ichise**

Within the Office Action, Claims 29-38, 40-42, 44-53, 55-66, 68 and 69 have been rejected under §102(b) as being anticipated by Ichise. The Applicant respectfully disagrees.

Ichise illustrates a single conveyor belt to convey a single stream of cullet delivered from a rotary feeder and a color discrimination device for discriminating a color of the passing cullet. Ichise's cullets are then blown by air nozzles into respective collection bins from the single stream of cullet. Hence, Ichise does not teach multi-stage sorting as claimed in the present application. Further, Ichise does not teach that one or more of the air nozzles sorts different colored objects into more than two output feeds.

In contrast to the teachings of Ichise, the method and apparatus for multi-stage sorting of glass cullets of the present invention includes a plurality of sorting devices which sort different colored objects based on their light transmission properties into more than two output feeds, wherein at least one output feed is a subsequent input feed to one or more sorting devices in the plurality of sorting devices. The one or more sorting devices sort the at least one subsequent input feed into a plurality of further sorted output feeds. At least one of the plurality of sorting devices is a final sorting device, wherein the final sorting device sorts one or more subsequent input feeds into a plurality of final output feeds. As described above, Ichise does not teach multi-stage sorting and, in particular, Ichise does not disclose, teach, or even suggest a sorting device that sorts the different colored objects into more than two output feeds.

The independent Claim 29 is directed to a method of effectively sorting different colored objects into a plurality of groups of objects having a similar desired quality. The method of Claim 29 comprises providing a plurality of sorting devices, wherein each sorting device receives a mixture of objects of different qualities and separates the different received objects into two or more output feeds, each output feed having objects of a substantially similar quality, wherein at

least one of the plurality of sorting devices sorts the different colored objects into more than two output feeds, and configuring the plurality of sorting devices such that at least one output feed in each of one or more sorting devices in the plurality is input into a corresponding subsequent sorting device. As described above, Ichise does not teach a sorting device that sorts the different colored objects into more than two output feeds. For at least these reasons, the independent Claim 29 is allowable over the teachings of Ichise.

Claims 30-38 and 40-42 are dependent on the independent Claim 29. As discussed above, the independent Claim 29 is allowable over the teachings of Ichise. Accordingly, Claims 30-38 and 40-42 are all also allowable as being dependent on an allowable base claim.

The independent Claim 44 is directed to a multi-level sorting system for separating a mixed stream of colored cullets into cullets having substantially similar color characteristics. The multi-level sorting system of Claim 44 comprises a first stage tri-sorter for sorting the cullets, wherein the first stage tri-sorter directs the sorted cullets into a plurality of first stage output paths, a second stage tri-sorter coupled to the first stage tri-sorter, the second stage tri-sorter for sorting cullets in at least one received first stage output path, thereby forming a second set of sorted cullets, wherein the second stage tri-sorter directs the second set of sorted cullets into a plurality of second stage output paths, a third stage tri-sorter coupled to the first and second stage tri-sorters, the third stage tri-sorter for sorting cullets in at least one received first stage output path and at least one received second stage output path, thereby forming a third set of sorted cullets wherein the third stage tri-sorter directs the third set of sorted cullets into a plurality of third stage output paths, wherein at least one of the first, second, and third stage tri-sorters has more than two output paths. As described above, Ichise does not disclose, teach, or even suggest such a multi level sorting system. Ichise does not teach a first stage tri-sorter, a second stage tri-sorter and a third stage tri-sorter, wherein at least one of the first, second, and third stage tri-sorters has more than two output paths. Further, Ichise does not teach a third stage tri-sorter which sorts cullets received in output paths from both first and second stage tri-sorters. For at least these reasons, the independent Claim 44 is allowable over the teachings of Ichise.

Claims 45-53, 55 and 56 are dependent on the independent Claim 44. As described above, the independent Claim 44 is allowable over the teachings of Ichise. Accordingly, Claims 45-53, 55 and 56 are all also allowable as being dependent on an allowable base claim.

The independent Claim 57 is directed to a multi-level sorting system for separating a mixed stream of colored cullets into cullets having substantially similar color characteristics. The multi-level sorting system of Claim 57 comprises a plurality of first stage tri-sorters for sorting the cullets, wherein the plurality of first stage tri-sorters direct the sorted cullets into a

plurality of first output paths, a second stage tri-sorter coupled to the plurality of first stage tri-sorters, the second stage tri-sorter for sorting cullets in at least one received first output path from each first stage tri-sorter, thereby forming second sorted cullets, wherein the second stage tri-sorter directs the second sorted cullets into a plurality of second output paths, a third stage tri-sorter coupled to the plurality of first stage tri-sorters and the second stage tri-sorter, the third stage tri-sorter for sorting cullets in at least one received first output path from each of the plurality of first stage tri-sorters and at least one received second output path, thereby forming third sorted cullets, wherein the third stage tri-sorter directs the third sorted cullets into a plurality of third output paths. As described above, Ichise does not disclose, teach, or even suggest such a multi level sorting system. Ichise does not teach a plurality of first stage tri-sorters, a second stage tri-sorter and a third stage tri-sorter. Further, Ichise does not teach a second stage tri-sorter that receives cullets from output paths from a plurality of first stage tri-sorters. Still further, Ichise does not teach a third stage tri-sorter which sorts cullets received in output paths from both first and second stage tri-sorters. For at least these reasons, the independent Claim 57 is allowable over the teachings of Ichise.

Claims 58-66, 68 and 69 are dependent on the independent Claim 57. As described above, the independent Claim 57 is allowable over the teachings of Ichise. Accordingly, Claims 58-66, 68 and 69 are all also allowable as being dependent on an allowable base claim.

#### **IV. Rejections Under §102 as being Anticipated by Frankel**

Within the Office Action, Claims 29-35, 42, 44, 45, 48, 51, 56-58, 61, 64 and 69 have been rejected under §102(b) as being anticipated by Frankel. The Applicant respectfully disagrees.

Frankel's Figure 1 illustrates a main conveyor that moves *plastic* bottles in a longitudinal direction. Frankel describes a series of sensing areas along the conveyor. Each of Frankel's sensing areas has a single ejector. Hence, Frankel does not disclose, teach, or even suggest:

- providing a sorting device that sorts the different colored objects into more than two output feeds, and
- configuring the plurality of sorting devices such that at least one output feed in each of one or more sorting devices in the plurality is input into a corresponding subsequent device.

In contrast to the teachings of Frankel, the method and apparatus for multi-stage sorting of glass cullets of the present invention includes a plurality of sorting devices which sort different colored objects based on their light transmission properties into more than two output feeds,

wherein at least one output feed is a subsequent input feed to one or more sorting devices in the plurality of sorting devices. The one or more sorting devices sort the at least one subsequent input feed into a plurality of further sorted output feeds. At least one of the plurality of sorting devices is a final sorting device, wherein the final sorting device sorts one or more subsequent input feeds into a plurality of final output feeds. As described above, Frankel does not teach providing a sorting device that sorts the different colored objects into more than two output feeds and configuring the plurality of sorting devices such that at least one output feed in each of one or more sorting devices in the plurality is input into a corresponding subsequent device.

The independent Claim 29 is directed to a method of effectively sorting different colored objects into a plurality of groups of objects having a similar desired quality. The method of Claim 29 comprises providing a plurality of sorting devices, wherein each sorting device receives a mixture of objects of different qualities and separates the different received objects into two or more output feeds, each output feed having objects of a substantially similar quality, wherein at least one of the plurality of sorting devices sorts the different colored objects into more than two output feeds, and configuring the plurality of sorting devices such that at least one output feed in each of one or more sorting devices in the plurality is input into a corresponding subsequent sorting device. As described above, Frankel does not teach a sorting device that sorts the different colored objects into more than two output feeds. For at least these reasons, the independent Claim 29 is allowable over the teachings of Frankel.

Claims 30-35 and 42 are dependent on the independent Claim 29. As described above, the independent Claim 29 is allowable over the teachings of Frankel. Accordingly, Claims 30-35 and 42 are all also allowable as being dependent on an allowable base claim.

The independent Claim 44 is directed to a multi-level sorting system for separating a mixed stream of colored cullets into cullets having substantially similar color characteristics. The multi-level sorting system of Claim 44 comprises a first stage tri-sorter for sorting the cullets, wherein the first stage tri-sorter directs the sorted cullets into a plurality of first stage output paths, a second stage tri-sorter coupled to the first stage tri-sorter, the second stage tri-sorter for sorting cullets in at least one received first stage output path, thereby forming a second set of sorted cullets, wherein the second stage tri-sorter directs the second set of sorted cullets into a plurality of second stage output paths, a third stage tri-sorter coupled to the first and second stage tri-sorters, the third stage tri-sorter for sorting cullets in at least one received first stage output path and at least one received second stage output path, thereby forming a third set of sorted cullets, wherein the third stage tri-sorter directs the third set of sorted cullets into a plurality of third stage output paths, wherein at least one of the first, second, and third stage tri-



sorters has more than two output paths. As described above, Frankel does not disclose, teach, or even suggest such a multi level sorting system. Frankel does not teach a first stage tri-sorter, a second stage tri-sorter and a third stage tri-sorter, wherein one of the tri-sorters has more than two output paths. Further, Frankel does not teach a third stage tri-sorter which sorts cullets received in output paths from both first and second stage tri-sorters. For at least these reasons, the independent Claim 44 is allowable over the teachings of Frankel.

Claims 45, 48, 51 and 56 are dependent on the independent Claim 44. As discussed above, the independent Claim 44 is allowable over the teachings of Frankel. Accordingly, Claims 45, 48, 51 and 56 are all also allowable as being dependent on an allowable base claim.

The independent Claim 57 is directed to a multi-level sorting system for separating a mixed stream of colored cullets into cullets having substantially similar color characteristics. The multi-level sorting system of Claim 57 comprises a plurality of first stage tri-sorters for sorting the cullets, wherein the plurality of first stage tri-sorters direct the sorted cullets into a plurality of first output paths, a second stage tri-sorter coupled to the plurality of first stage tri-sorters, the second stage tri-sorter for sorting cullets in at least one received first output path from each first stage tri-sorter, thereby forming second sorted cullets, wherein the second stage tri-sorter directs the second sorted cullets into a plurality of second output paths, a third stage tri-sorter coupled to the plurality of first stage tri-sorters and the second stage tri-sorter, the third stage tri-sorter for sorting cullets in at least one received first output path from each of the plurality of first stage tri-sorters and at least one received second output path, thereby forming third sorted cullets, wherein the third stage tri-sorter directs the third sorted cullets into a plurality of third output paths. As described above, Frankel does not disclose, teach, or even suggest such a multi level sorting system. Frankel does not teach a plurality of first stage tri-sorters, a second stage tri-sorter and a third stage tri-sorter. Further, Frankel does not teach a second stage tri-sorter that receives cullets from output paths from a plurality of first stage tri-sorters. Still further, Frankel does not teach a third stage tri-sorter which sorts cullets received in output paths from both first and second stage tri-sorters. For at least these reasons, the independent Claim 57 is allowable over the teachings of Frankel.

Claims 58, 61, 64 and 69 are dependent on the independent Claim 57. As described above, the independent Claim 57 is allowable over the teachings of Frankel. Accordingly, Claims 58, 61, 64 and 69 are all also allowable as being dependent on an allowable base claim.

In view of the foregoing, Claims 1-69, are in condition for allowance. Examination is respectfully requested and allowance is earnestly solicited at the earliest possible date. The Examiner is encouraged to call the undersigned at (408) 530-9700 to discuss with questions or concerns so that any outstanding issues can be expeditiously resolved.

Respectfully submitted,  
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CERTIFICATE OF MAILING (37 CFR § 1.8(a))

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